about a cavity, others lie croſs a cavity, as *G*. All theſe particles were eminently tranſparent.

About *A*, *B*, *C*, *D*, there are near the edge of the Nerve ſome tranſparent winding ſtroaks.

Other Microſcopical Obſervations, made by the ſame, about the texture of the Blood, the Sap of ſome Plants, the Figure of Sugar and Salt, and the probable cauſe of the difference of their Taſts.

IN my former I told you, how that the clearer aqueous matter of the Blood, being that Liquor in which the red ſanguineous globuls ſwim, doth likewiſe conſiſt of globuls; and that I had obſerved ſuch in that aqueous matter, when the moiſture was ſomewhat, or for the moſt part, exhaled. But now I cannot omit to acquaint you, that a few daies after I had ſent away that Letter, I ſaw the plain globuls move in that wateriſh matter without any evaporation made; though there were but very few of them, and they appeared white where they lay together. And on this occaſion I very well remember, that, about two years ago, I divers times obſerved my own Blood, and noted, that thoſe ſanguineous globuls that make the Blood red, ſeemed then to be firmer and harder than they are in my Blood now; at which time my Body was very much indiſpoſed, ſo that I fell into a ſickneſs, which held me near three weeks: But now I find thoſe globuls of my Blood ſofter, and more ſticking to one another, and my Body in a good ſtate of health. I know not, whether ſome ſickneſſes, and even death it ſelf, may not ſometimes proceed from the hardneſs of thoſe globuls. I am apt to imagine, that thoſe ſanguineous globuls in a healthy Body muſt be very flexible and pliant, if they ſhall paſs through the ſmall capillary Veins and Arteries, and that in their paſſage they change into an oval figure, reaſſuming their roundneſs when they come into a larger room.

Beſides this, I have obſerved in the clear matter of the Blood figures of a quadrangular form, which I ſuppoſe to be ſome ſalin parts; further to be examined hereafter.

But I ſhall proceed to give you an account of the Obſervations I have made of the Sap of ſome Plants. ***Arum*** (***Wake-robin***) being taſted by me, and found very ſharp upon the tongue, I found by my Microſcope, that the Leaf thereof did conſiſt of globuls not exactly round, and theſe again of particles incomparably ſmaller than thoſe. Having pulled the Stalk from the Leave, and tranſverſly cut it thorough, I diſcovered in the parts of this Stalk (which I ſhall call *Pores*) very thin Figures, which at length appeared to me in *my* Microſcope, of the thickneſs of a great Bread-knives back, and its thickneſs of that of a Spiders-web, when ſeen by the naked Eye. Theſe fine Figures lay in the ſaid Pores in a heap, in ſome, ten or fifteen of them together. Having cut ſome of the Leaves of this Herb in pieces, upon a clean Pewter-plate, and ſqueez'd the Juyce out of it, I found it ſo thick of its ſmalleſt parts, that it ouſed but very ſlowly through blew Paper; and looking upon this ſtrained Juyce, I found it alſo ſo thick, and ſo ſticking, that I could obſerve nothing therein but partly abundance of ſmall particles, which by reaſon of their ſmalneſs appeared not figured, partly ſome bigger parts, which likewiſe, by reaſon of their ſticking matter, yielded no Figure to my Eye. But then viewing the thicker part of this Juyce, which remained behind in the Blew-paper, I ſaw, that that conſiſted almoſt all, excepting a little Sap, of the ſaid very ſmall particles, of which more than a thouſand make one globul, and of which the Leaf was made up. And I imagined, that I ſaw, between the very ſmall particles, ſome little Figures or Pipes, as I ſaid I had ſeen in the pores of the ſtalk of the Leaf. But this I could not perfectly diſcern, by reaſon of the various parts that were in the Sap, how thin ſoever I ſpread it, and repreſented it to me. Holding ſome of the ſaid thick Sap to a little fire, by which the ſaid particles of the Leaf did in part burn away, I then noted very many of the ſaid thin ſmall figures or pipes, which I had ſeen in the Stalk of the Leaf. Theſe little pipes were of a much firmer matter, than the particles which the Leaf was made up of; for, though I ſuffered moſt of the little particles of the Leaf to burn away in ſome places, yet the ſaid ſmall Pipes remained almoſt entire, without any viſible detriment to them. And I afterwards ſaw in the expreſſed Sap of *Arum*, without holding it to the fire, the ſame little Pipes moving very plainly. And when after this, upon the fading of the Leaf, the ſeed upon the Stalk being yet green, I expreſſed the ſap out of the Stalk, I perceived alſo the little pipes in this expreſſed Sap.

Now 'tis likely, that theſe Pipes in this Herb are the cauſe of the ſmart that is felt in chawing the *Arum*, by the motion of the

moiſt

moiſt Tongue in taſting: For that there may be a long-laſting motion, remaining in Liquors or Saps upon a little ſtirring (which in our caſe occaſions the pain,) hath been divers times by me obſerved, and particularly in Water frozen in Winter, affixed to the pin of my Microſcope: In this little Icy particle, though it be no bigger than a ſmall pins head, I ſaw, as ſoon as it thawed, very many terreſtrial particles moving in the water, (which before the congelation were not viſible,) and continuing ſo long in that motion, that my eyes were tired with looking on. The like motion I have noted in the Juyce, ſqueezed out of the upper peel of a freſh Limon, wherein thoſe little globuls, of which that peel is compoſed, do move, which are looſened by the ſqueezing of the Juyce. This motion of the ſaid particles in the moiſture is very pretty to behold, and many Spectators would ſwear they were little living Animals. Obſerving this motion, I conceived, that the motion of the ſharp particles that are in ſome Saps, was not leſs, eſpecially being ſet on by the motion of the Tongue.

What further concerns in general the Saps of Herbs obſerved by me, I find in them peculiarly figured ſmall bodies, but that for the moſt part in ſuch as I have ſuffered part of the moiſture to be exhaled from. But ſuch little Pipes, as I have mentioned to be in the Herb *Arum*, I have not diſcovered in any other Plants, hitherto viewed by me, but in the Sap of green *Vine-branches*, and *Aſparagus*, and very many of them in the Sap of the ſtalk and leaves of *Cataputia* (*Spurge*,) and ſome few in the Sap which I ſqueezed out of the Root of *White Hellebore*. But to diſcover the vertues and operations of Herbs from the figures of their Saps, is an undertaking as yet too difficult for me. For, ſuppoſe there were half a ſcore ſorts of Herbs, in the Saps of which there were found one and the ſame Figure, as for example, ſuch an one, in which the *baſis* of the figure conſiſts of a triangle, or quadrangle, and the ſides of them running up to the ſhape of a Pyramid, after the manner of a well poliſht triangular or quadrangular pointed Diamond (for ſuch a Figure I have diſcovered in ſome ſaps of Herbs;) I am then to imagine, that, when I ſee ſuch or the like figures in Saps, their beginning hath been a thouſand or more times ſmaller; I muſt think beſides, that we cannot diſcover any of the minute particles of any Sap, with the moſt perfect Microſcope, but the little figure of them hath been from its beginning much ſmaller:

I eſteem alſo, that when it is very ſmall, it hath the ſame form and faſhion with that when grown bigger, and being grown bigger, that tis compoſed of the ſaid very ſmall particles. Now, if theſe little figured parts of thoſe Saps, which I ſuppoſe to be the ſmalleſt of that kind, and yet ſuch, as that the *baſis* of them is triangular or quadrangular, and that beſides they are all alike ſtrong, or equally flexible; if theſe, *I ſay*, did lye upon our Tongue, and were preſſed againſt the globuls of our Tongue, and none of them all were altered by moiſture or warmth, I ſhould then judge, that all thoſe little Figures of the ſaid ſaps of Plants would have one and the ſame taſte and operation.

To illuſtrate which, I ſhall here ſpeak of the difference of the taſte between *Salt* and *Sugar*. The grain of *Sugar* then conſiſts of divers pointed and angular ſmall Figures; and yet how angular and pointed ſoever theſe Figures are, they would not, if they remained intire, cauſe any taſte upon our Tongue, foraſmuch as (with ſubmiſſion to better Judgment,) their angles and points are big, each point or angle of theſe grains of Sugar not touching one or two globuls of our Tongue, but comprizing a great number of them; and that the rather, becauſe I take it for granted, that a ſingle globul, (of which bodies the pointed protuberances of our Tongue are made up,) is many thouſand times ſmaller than a common grain of Sand, and therefore can produce no taſte. For, take a poliſht pointed Diamond, of an ordinary bigneſs; and put it on the back of your hand with the point downward, and preſs it upon your hand with the force of a pound weight; this preſſure will cauſe but little ſmart to the hand, in regard that the preſſure or force, put to the Diamond, doth not only touch the extream point of a Diamond, but many other points, foraſmuch as our skin, being ſoft and pliable, will, where that extream point comes to touch, ſink a little inward, and ſo, according to the bigneſs of the Diamond, will cloſe about the whole, or the greateſt part of the ſame; whereby the skin will be toucht, as was ſaid, not in one only point, but in many, though indeed moſt of all by that which is the ſharp end of the Diamond. Now this ſeems to be the reaſon, why *Sugar*, if it were ſo hard and rigid as not to be diſſolved in water, or warmth, would be inſipid, foraſmuch as it would not cauſe any pungency upon the globuls of the Tongue, when the Sugar-grains lye thereon, by reaſon of the ſmall preſſure made by the Tongue againſt the roof

of

of the mouth. But then, if we ſhould ſuppoſe, that a Diamond were thouſands of times leſs, and were put upon our hand with the preſſure of one pound weight, it would then not only cauſe ſmart, but doubtleſs, if no bones did hinder, run through the whole hand. Juſt ſo, if the ſmall grains of Sugar were thouſands of times leſs than they are, and rigid withal, then their points would not touch many globuls at once, but only one globul, and ſo would produce no pleaſure but pain, for with their ſharp angles they would wound the globuls of our Tongue. But, Sugar is a body diſſoluble in water, and that the more readily if warmth do accompany it. Wherefore that ſubſtance, when put upon the Tongue, is diſſolved by the moiſture and warmth it meets with there, and unites with the *Saliva* of the mouth, and ſo proves even ſmooth and ſoft upon the Tongue, affecting it with pleaſure. But *Salt*, on the contrary, though it diſſolves in water as to its great parts, yet doth it retain ſome rigid ſmall particles, which by warmth, when they are taken upon the Tongue, grow yet more rigid, and are ſo ſubtile, that they *prick* the globuls of our Tongue, though not ſo ſtiff, that they *wound* them.

To this I ſhall add my Obſervations about *Manna*: This ſubſtance I have found to conſiſt of long ſmall pipes, which I have ſeen, when put in water, to unite therewith as Sugar doth, and on that account is alſo ſweet upon the Tongue. And repreſenting that water to my eye as thin as I could, and ſuffering it to exhale, it afforded very pretty pipes; and adding ſome more warmth to it, thoſe Pipes grew ſomewhat ſtiffer. Seeing this, I imagined, that as *Manna* diſſolves in a little warmth, and in water, (both which is found upon our Tongue,) ſo in more warmth, which it meets with when taken down into our body, it changes into the ſaid pipes: And, in regard that by the pricking of them there is cauſed in the globuls of our Bowels an unuſual, preternatural and ſtronger commotion, the chyle that is there is carried off more ſtrongly and more ſpeedily, taking along with it that matter, which by the impulſe of the pipes on the bowels is looſen'd. And adding yet ſome more fire to the pipes of the *Manna*, they turn'd into a kind of ſyrup. This gave me thoughts, that the ſaid pipes, not being ſtrong, did work but ſoftly upon our Bowels, and that this poſſibly was the cauſe of their kind operation; as alſo, that there being ſome bodies, in which there might be inwardly on extraordinary heat, the *Manna* might there, inſtead of ſhooting into pipes, turn into

into a ſyrup, and ſo produce little or no effect as to purgation.

But to return to the matter whence we have digreſſed, I mean to the ſameneſs of Figures in ten ſorts of Saps of Herbs, it may come to paſs, that each of theſe Saps may, notwithſtanding the identity of that Figure, yield a peculiar taſte differing from the reſt. For, ſuppoſe the ſmall Figures that are in one Sap of the ten Herbs, to be of ſuch a ſtiffneſs or hardneſs, as that they do in ſome degree affect the globuls of our Tongue, and ſo produce a taſte proportionable; if the Figures of the Sap of another of thoſe Herbs be a degree ſtiffer or harder, and ſo on of the reſt, then will each degree of hardneſs in thoſe Figures cauſe more or leſs ſharpneſs of taſte upon our Tongue, and conſequently produce a ſutable operation.

What I have obſerved in the examination of ſeveral ſorts of *Wines* (in moſt of which I have diſcovered exceedingly pretty Figures) I muſt refer to another opportunity. Mean time, I ſhall be glad to hear how theſe my Obſervations are received, and what Objections are made againſt them, remaining

Yours, &c.